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Authors: Leaché, Adam D., and Boateng, Ofori Caleb

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Chapter 7

A Rapid Survey of the Amphibians and Reptiles of Ajenjua Bepo and Mamang River Forest Reserves, Eastern Region of Ghana

Adam D. Leaché and Ofori Caleb Boateng

SUMMARY

We recorded 45 species of amphibians and reptiles (21 frogs, 1 caecilian, 13 lizards, and 10 snakes) at Ajenjua Bepo and Mamang River Forest Reserves during 12 days of fieldwork beginning 24 August and ending 4 September, 2006. The portrait of species richness at these sites decreases to only 17 species when considering only those species found in forest habitats. We documented one Near Threatened species, the Tai Forest treefrog *Leptopelis occidentalis* (IUCN 2008), which we found at both sites. Future surveys during more optimal environmental conditions are required at Ajenjua Bepo and Mamang River Forest Reserves to provide a more accurate account of the species richness remaining in these fragmented forest habitats.

INTRODUCTION

The Guinean forest of Western Africa is a center of biological diversity with considerable endemism (Myers et al. 2000). Unfortunately, the incredible biodiversity in this region faces numerous threats including logging and land conversion for agriculture (Hawthorn and Abu-Juam 1995) and the bushmeat trade (Milner-Gulland et al. 2003, Brashares et al. 2004, Cowlishaw et al. 2005). In Ghana alone, less than 15% of the original forest cover remains as a result of logging (Poorter et al. 2004). Thus, a higher value must be placed on the remaining forest fragments to ensure biodiversity preservation.

The Ajenjua Bepo and Mamang River Forest Reserves, located in the Eastern Region of Ghana, represent two isolated forest fragments that still contain suitable habitat for forest-dwelling species. The topographical complexity of Ajenjua Bepo (peaks exceeding 450 m) and larger relative size of Mamang River (53 km², almost ten times larger than Ajenjua Bepo) make them interesting sites for a comparison of biological species richness.

Amphibians and reptiles are a prominent and conspicuous component of the West African forest fauna. They can occur at high densities in the tropics and play important roles as primary, midlevel, and top consumers (Duellman 2005). For biological assessment, amphibians are especially useful for evaluating the health and integrity of the environment (Stuart et al. 2004). Amphibians respond early to environmental changes and are relatively easy to detect in even the most complex forest habitats.

The reptile and amphibian fauna of Ghana is among the most diverse and well-studied in West Africa (Schiøtz 1967, 1999; Hughes and Barry 1969; Hughes 1988; Raxworthy and Attuquayefio 2000; Rödel et al. 2003; Leaché 2005; Rödel et al. 2005; Leaché et al. 2006). This wealth of information on the distribution and ecology of amphibians and reptiles throughout Ghana, coupled with the utility of amphibians as good environmental indicator species, makes this an appropriate taxonomic group for rapid assessment.

METHODS AND STUDY SITES

We conducted a rapid assessment of amphibians and reptiles at Ajenjua Bepo and Mamang

River during the end of the rainy season from 24 August – 4 September, 2006. Ajenjua Bepo is characterized by hilly terrain composed of semi-deciduous forest surrounded by plantation and cocoa plantations. Mamang River is relatively flat in topography and contains a larger area of intact forest compared to Ajenjua Bepo, but is also surrounded by plantations (cocoa and palm). Despite sporadic rain showers throughout our survey that intensified during our work at Mamang River, the entire area was uncharacteristically dry for the season and little or no water was present in the majority of the forest streams. The lack of standing or flowing water in these areas provided suboptimal environmental conditions for detecting amphibians.

We surveyed a diversity of habitat types at Ajenjua Bepo and Mamang River, including semi-deciduous forest, secondary forest, plantations (cocoa, plantain, and palm), villages, and some larger rivers located outside of the forest reserves that still contained some small pools of water (Appendix 5). We surveyed habitats during the day and night to document both diurnal and nocturnal species. We searched for reptiles by turning over rocks and logs, digging through leaf litter, peeling bark from trees, and by opportunistic visual encounters. We searched for amphibians using similar methods and also surveyed frogs by acoustic monitoring.

Table 7.1. Amphibian and reptile species recorded in forested areas of Ajenjua Bepo and Mamang River forest reserves.

| Species | Ajenjua Bepo | Mamang River |
|-----------------------------------|--------------|--------------|
| Anurans | | |
| <i>Arthroleptis poecilonotus</i> | x | |
| <i>Bufo maculatus</i> | | x |
| <i>Bufo regularis</i> | | x |
| <i>Leptopelis hyloides</i> | x | x |
| <i>Leptopelis occidentalis</i> | | x |
| <i>Phrynobatrachus calcaratus</i> | x | x |
| <i>Phrynobatrachus plicatus</i> | | x |
| Lizards | | |
| <i>Cnemaspis spinicollis</i> | x | |
| <i>Hemidactylus fasciatus</i> | x | |
| <i>Hemidactylus cf. muriceus</i> | x | x |
| <i>Hemidactylus sp.</i> | x | |
| <i>Cophoscincopus simulans</i> | x | |
| <i>Panaspis togoensis</i> | | x |
| <i>Panaspis sp.</i> | x | x |
| Snakes | | |
| <i>Atheris chlorechis</i> | | x |
| <i>Lycophidion nigromaculatum</i> | x | |
| <i>Thelotornis kirtlandii</i> | x | |
| Total | 11 | 10 |

The pitfall trap lines established to capture small mammals also resulted in several reptile and amphibian captures.

The voucher specimens, tissue samples, and other ancillary data collected for this survey are available for further biological research from the Museum of Vertebrate Zoology at the University of California, Berkeley, USA (Accession number 14251; catalog numbers MVZ 252397-252621). Detailed collecting records and geospatial data for these specimens are also available on the Internet at <http://mvz.berkeley.edu/>.

RESULTS AND DISCUSSION

We detected a total of 45 species (21 frogs, 1 caecilian, 13 lizards, 10 snakes) at Ajenjua Bepo and Mamang River (Appendix 6). Although more frogs were recorded than any other species (21 species), we expect that the number of frog species present at these sites should be much higher. Further surveys of these sites during the rainy season are needed to confirm this suspicion.

The species counts for Ajenjua Bepo (31 species) and Mamang River (30 species) are roughly similar, but the composition of amphibians versus reptiles at the two sites is strikingly different. For instance, at Ajenjua Bepo we detected 11 species of amphibians and 19 reptiles, whereas at Mamang River we detected 18 species of frogs and 12 reptiles (Appendix 6). These differences are likely attributable to the differing weather conditions that we experienced at the two sites. At Ajenjua Bepo the weather was mostly sunny and warm (ideal for reptiles), whereas the weather was cool and cloudy with daily rain showers at Mamang River.

The number of species recorded in the forested parts of Ajenjua Bepo and Mamang River is low (Table 7.1), with a total of only 17 species recorded. This species richness is sparse considering that Rödel et al. (2005) detected 47 amphibian species in south-western Ghana forests; however, the duration of the survey by Rödel et al. (2005) encompasses far greater man-hours. It is unclear if the scarcity of amphibians within these reserves is a reflection of their true absence, which would imply that habitat degradation and/or fragmentation has eliminated a significant portion of the amphibian fauna. An alternative is that the sub-optimal weather conditions prevented us from detecting more species. Future surveys during more optimal environmental conditions are required to provide a more accurate account of the amphibian fauna remaining in these fragmented forest habitats.

The only species of conservation concern that we detected was the Tai Forest treefrog *Leptopelis occidentalis*, which is ranked by IUCN as Near Threatened. We found this species at both Ajenjua Bepo and Mamang River, although a difference in abundance was apparent. We documented fewer than six specimens of this species at Ajenjua Bepo, while we found over 25 at Mamang River and heard many more calling from the forest. We also noted a difference in the habitat with which these frogs were associated between the two sites. At Ajenjua Bepo, we only detected this species

hidden in vegetation overhanging a dry stream in the middle of a plantain plantation, whereas at Mamang River we found this species calling from the vegetation along dry streambeds throughout the forest. It is possible that the increased rain that we received while at Mamang River Forest Reserve was responsible for the increased abundance of this frog at that site, but we were not able to return to Ajenjua Bepo and determine if the rain increased frog abundance there.

The forest frog *Phrynobatrachus plicatus* was only detected at Mamang River Forest Reserve. The habitat at Ajenjua Bepo Forest Reserve appears suitable for this species, so it is unclear if our inability to detect this species reflects a true absence. Further survey work during more appropriate weather conditions is required to determine if this frog is indeed absent from Ajenjua Bepo.

Another noteworthy amphibian that we recorded is the Caecilian *Geotrypetes seraphini*. Caecilians are legless, snake-like amphibians that are not well known because they are largely fossorial and very secretive. We found one specimen under a log in a cocoa plantation near Ajenjua Bepo. *Geotrypetes* occur throughout the forest regions of Ghana, but are difficult to detect because they spend most of their time underground.

We detected some forest snakes, although in most cases they were only detected on the forest edge in plantations. Snakes that we found in forest include *Atheris chlorechis*, *Lycophidion nigromaculatum*, and *Thelotornis kirtlandii*. Snakes are notoriously difficult to detect (Duellman 2005), and we are certain that additional survey work in these areas will produce records for additional species.

We detected several species of lizards that are typical of forest habitats. These species include *Cnemaspis spinicollis*, *Hemidactylus muriceus*, *H. fasciatus*, *Panaspis togoensis*, and *Cophoscincopus simulans*. The only population of *C. simulans* that we found during our survey was located in Ajenjua Bepo and was restricted to a small section of a forest stream composed of rocky terrain and seeps covered by mosses and ferns. This area of Ajenjua Bepo appears unique, and it is likely that these small aquatic lizards are restricted in their distribution to this one area.

CONSERVATION RECOMMENDATIONS

Preserving the integrity of the remaining forest fragments at Ajenjua Bepo and Mamang River should be treated as a critical conservation goal. Both reserves deserve protection since each contains high-quality habitat for forest-restricted reptiles and amphibians. Of particular importance is the conservation of forest stream habitats, since this is where we documented the Tai Forest treefrog *Leptopelis occidentalis*. Very little is known about the ecology and natural history of this species, although it is clearly a forest-dwelling species (Schjøtz 1999). Although Mamang River contains larger tracts of continuous forest, which is vital for the persistence of some species, the hilly topography at Ajenjua Bepo is unique and also deserves attention. Habitat loss, expedited

by the illegal encroachment of plantations into the forest, appears to be the biggest threat to the reptile and amphibian faunas. Hunting also poses a risk to larger reptiles (e.g., monitor lizards and turtles) and amphibians (e.g., slippery frogs), although we did not detect these species in either forest reserve.

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